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# Study in Physical Vigor

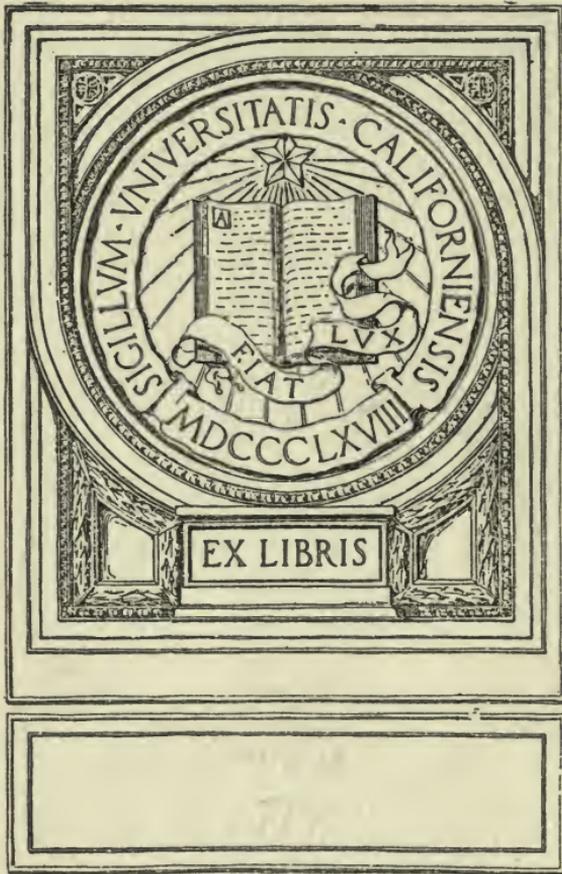
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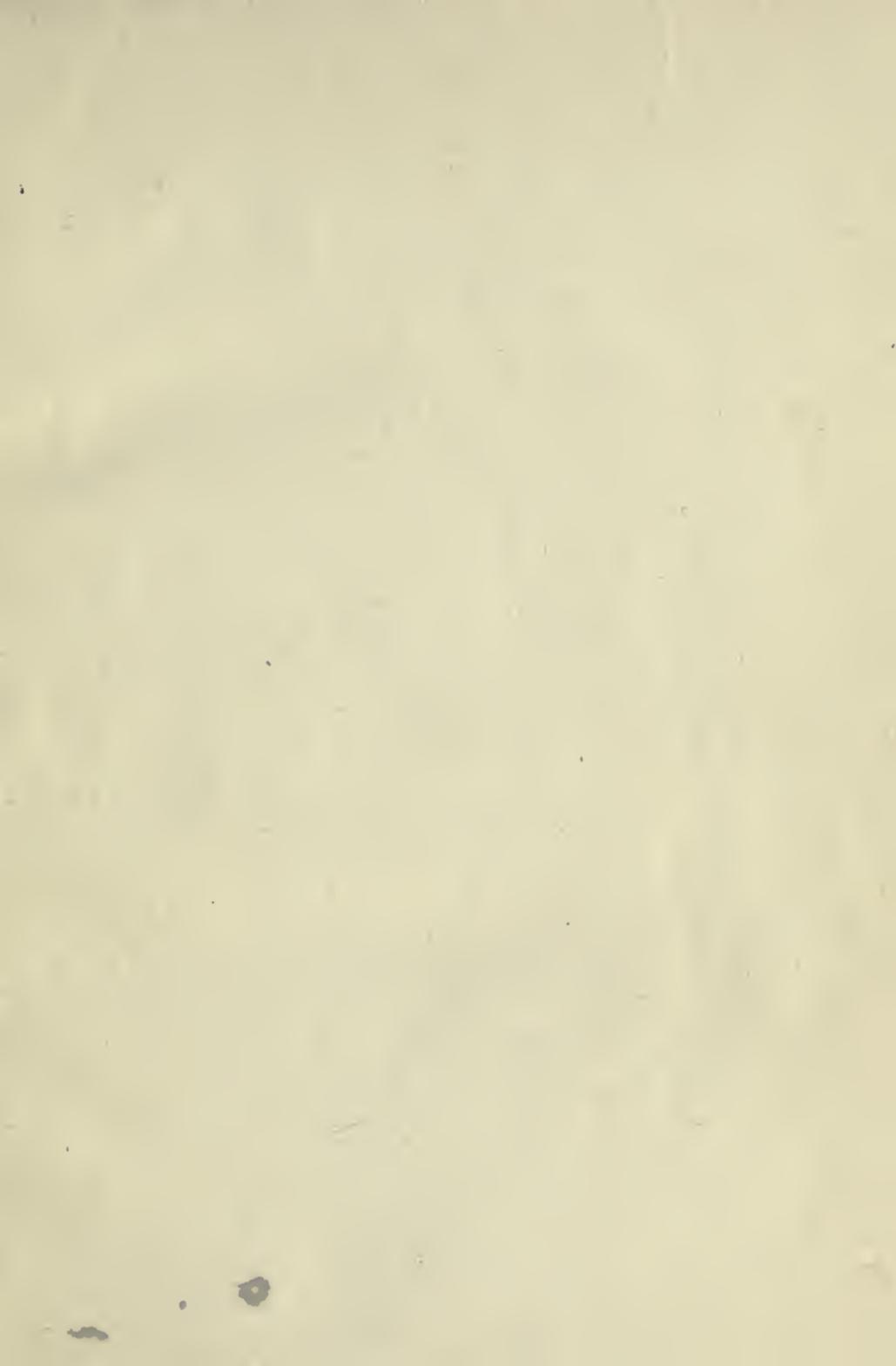
EDWIN E. JACOBS

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# A STUDY OF THE PHYSICAL VIGOR OF AMERICAN WOMEN

BY

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UNITED STATES DEPARTMENT OF JUSTICE  
BUREAU OF INVESTIGATION  
WASHINGTON, D. C.

REPORT OF SPECIAL AGENT IN CHARGE  
JAMES EARL RAY

TO THE  
ATTORNEY GENERAL

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REPORT OF SPECIAL AGENT IN CHARGE  
JAMES EARL RAY

## PREFACE

In spite of Sparta with her sturdy women athletes; in spite of the Scythian Amazons, fierce and successful warriors; in spite of the women of Japan, coaling great vessels by their physical labor, and the women of the hill tribes of India, carrying stone upon their heads; in spite of the unbroken record of savages without number, among whom women are the beasts of burden, we still persist in our pretty legend that the woman is "the weaker vessel."

In a narrative by an English traveler, Hearne, of a journey in the wild northwest, they were told that all their troubles were due to their having no women with them.

"When all the men are heavy-laden," said his critic, they can neither hunt nor travel to any considerable distance; and in case they meet success in hunting, who is to carry the produce of their labor? Women were made for labor; one of them can carry or haul as much as two men can do."

No weaker vessel about the women of the wild northwest.

The last two generations have seen a great change even among ladies. The outdoor sports, the change in costume from a long flowing riding

habit to a divided skirt, the joy of our girls in ball and tennis, golf, swimming, sailing, even flying—these have changed first the women and then, slowly, our ideas about them.

Now comes the steady light of scientific research to establish these things as recorded facts, buttressed by many figures.

This book of President Jacobs is not long nor heavy, yet the subject matter is of the highest social importance.

He recognizes what is so strongly postulated by Lester F. Ward, that biologically speaking “the female not only typifies the race but metaphor aside she IS the race;” and then proceeds to show that this guardian of human destinies is growing more worthy of her high responsibility.

From year to year, from decade to decade, she is creeping up taller, larger, stronger, more healthy and vigorous, she is becoming fitter for her work, better able both to build and to be, a great humanity.

Everything which can promote this beneficent progress and our full appreciation of it is of world service, therefore we should welcome a careful study like this, and spread the knowledge of it.

CHARLOTTE PERKINS GILMAN.

## FOREWORD

In seeking to determine the general native physical vigor of any population, there are no better or more representative groups perhaps than those to which most attention is paid in the following pages, i. e., unmarried females. These, as it will readily be seen, suffer less from whatever ill effects there may be in industry and child-bearing. Moreover, the female part of our population suffers less also from the ill effects of alcohol, tobacco, and venereal diseases. Hence to get at the most representative class which might be taken as an index from the status of the basic health of America, the women of the country were selected as a basis of study and the greatest attention was given to college girls.

The conclusions to be drawn are, therefore, not to be confined to the classes studied only, but are to be applied to the citizens of America in general. It is easily conceivable that the male half of the population of a country can neither be very far ahead nor behind the female part in its general health. Hence the selection of the groups for this study.

Worcester, Mass.



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# A STUDY OF THE PHYSICAL VIGOR OF AMERICAN WOMEN

## CHAPTER I

### Introduction

The physical vigor of any people is, beyond any doubt, a powerful factor in their civilization for it affects profoundly every aspect of their life. Its effect is significant on their industrial life for only the strong can be efficient workers. A nation's physical vigor also affects its military standing for only the physically fit can be able soldiers. Furthermore, it affects a people's racial continuity for the physically vigorous are more likely to have not only a sufficient number of offspring, but at the same time the most vigorous and healthy ones. Indeed, it takes but a moment's reflection to see that, "the first wealth is health," that a nation's greatest asset is the physical vigor of its citizens, that a nation is bankrupt which has an insufficient supply of virile men and women, and that sound physiological vigor is all essential for national prosperity and racial continuity.

Professor Giddings (1) says that "physical vigor, physiological power, is the only sure basis of enduring human excellence," which statement wholly agrees with John's inspiring motto that

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“Only strong muscles can make men great or a nation free.” So important to their own welfare, is the physical vigor of their people, that many nations from antiquity on down to the present time, have given some attention to the health, physical endurance, and prowess of their citizens. This is shown by the Greeks in their striving after a perfect human form and by their perennial interest in public games and contests, an interest which was also later exhibited by the Romans. But in more recent years, the interest attached to national vitality is indicated by the fact that it has been the subject for frequent investigations both of a public and private character. In both Europe and America, numerous commissions have been appointed by the governments of different nations, whose duty it was to look into what is often spoken of as “racial deterioration,” to report whether they found indications of such a decline, and to suggest methods of resisting it.

Among many writers (2) upon this subject there seems to prevail the idea, that there is such a decline. They hold that we as a race are illustrating that old adage, that “we are growing weaker and wiser,” notwithstanding all our increased culture and our advance in the sciences. Moreover, it is often pointed out that war especially is responsible for much of this so-called physical decline. Madison Grant (3) suggests that the Napoleonic wars are responsible for as much as four inches decrease in the stature of the

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French people and further estimates that the recent world war will greatly reduce the physical vigor of the people engaging in it.

David Starr Jordan (4) and others make estimates of like character. It is furthermore pointed out that during the Boer war (5) it was found that only 10 percent of the men applying at the recruiting station in Manchester, were found fit for service, and that England had to lower her physical standards for soldiers three times within the past half century (6).

Hence, for these and other reasons, many have concluded that the race both in England and America, is undergoing a genuine physical decadence. Without expressing an opinion upon the facts presented above, it seems highly important to investigate this subject, and to seek to determine whether such a decline has set in, and if so, to ascertain whether it is measurable. Now woman's contribution to the national vitality is of great importance and doubtless as highly significant as that of man's for taken by-and-large, the men of a country can be no stronger than their mothers. Indeed, Dr. Sargent (7) says that "as a matter of fact, most of the famous athletes whom I have examined, attribute their great physical power largely to the fine physique of their mothers." And certainly the mother's part in reproduction would have far reaching results considered from the standpoint of eugenics.

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I purpose in this study, therefore, to show that there is no real evidence of a decline in the physical vigor of the women of America, but on the other hand to bring such evidence forward as will show that there are now tendencies set going to increase their physical vigor. By physical vigor here is meant that condition of the physical life in which there is energy enough developed not only to keep the body alive and active, but moreover a surplus which may be utilized in other ways.

Now it is a well known fact, that beginning about half a century ago, the social status of woman began to undergo a most profound re-adjustment in America, for about this time, there set in forces which were to bring about two very remarkable changes, viz., (1) the reduction of the size of the family, and (2) the passing of many household arts and crafts. The first of these two changes is shown by the following data (8) relative to the size of the family in America for the past sixty years:

Year	1850	1860	1870	1880	1890	1900	1910
No. in Family	5.6	5.3	5.1	5.0	4.9	4.7	4.3

It will be seen from these figures that there has been a steady decline in the size of the family within the last five or six decades and this could not help but have a very striking effect upon the health and physical vigor of woman. The second of these changes, viz., the passing of many household arts and crafts, is shown by the fact that,

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soon after the close of the Civil war in America, there was a very profound industrial re-adjustment. The factory system of manufacture began to replace home industries. Articles that for years had been made by the women of the household, were now made in improved ways in the shops. This left both their minds and hands free from drains that had for centuries sapped their energies.

I purpose, furthermore, to correlate these two, viz., woman's increased physical vigor, and her release from excessive child-bearing and household drudgery. I purpose to show that, with these changes setting in, in woman's social status, she had both time and energy to devote to other things and that with this surplus of leisure and strength, she blossomed out, gaining in intellectual and physical vigor. Her energies no longer thus dissipated, she had time to develop and grow. In accordance with the principle of individuation as laid down by Herbert Spencer, (9) the energy which formerly was devoted to the reproduction and care of offspring, could now be used in self-development. Since there are two forces present in every organism, one showing itself in the production of other individuals, and one in all the processes of self preservation, they must at all times be in the process of equilibrium, and as one increases the other must decrease. Hence if individuation includes all the processes which complete and sustain the life of the individual, and if

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reproduction includes all the processes which result in the formation of new individuals, then between individuation and reproduction there must always be more or less opposition. Hence when woman was relieved of this age-old drain upon her physical resources of bearing children, she began to build up her own body. One would expect, then, to find that modern women, improved both physically and mentally, would expend their surplus energy in many new ways.

Accordingly, one would expect them to enter wider fields of activity such as business and the professions. This they did as will be shown by an examination of the Reports of the Census for the past half dozen decades. In 1870 only about 13 percent of the total female population over ten years of age, was engaged in gainful occupations while by the year 1910, the percent had risen to 23.4. The expression, "gainful occupations" as used in the Census Reports, does not include housekeeping. About this time, that is, about the decade beginning with the year 1870, there was a most significant increase in women's attendance in the schools and colleges, for in 1879 there was but one white girl out of every 916 white women in a school of higher learning in the United States. By the year 1915 there was one out of every 371 in some school of higher learning. (10). And calculations based upon the distribution of "commencement prizes and honors" as listed in the catalogues of upwards of one hundred co-edu-

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ational colleges, shows that these were almost exactly equally divided, about half going to men and half to women.

Also during this period, according to a recent study by Patee, (11) there was a veritable outburst of feminine activity in the field of literature. This was represented by such a brilliant galaxy of literary women as Louisa Alcott, Helen Hunt Jackson, Celia Thaxter, Sarah Jewett, Mary Freeman, Elizabeth Stuart Phelps and others. To be added to these, are many present day writers such as Jean Stratton Porter, Mrs. Perkins Gilman, Anna Howard Shaw, and many others. So also are the women of the present day interested in art, music, the drama, and public matters generally. If spontaneous, earnest endeavor is any indication of vigor, then these women together with others, such as Jane Addams, Harriet Keeler, Ella Flagg Young, etc., who are active in public matters generally, furnish evidence of feminine physical vigor, for taken by-and-large, vigorous people are the originators of vigorous ideas.

This study, however, will deal more particularly with woman's physical vigor as indicated by physical conditions. Hence an investigation will be made of those physical conditions which tend most to exhibit her rising power and which can be detected with some degree of accuracy. This investigation will be along the following four lines, viz., 1, fertility, 2, longevity, 3, anthropological measurements, and 4, interest and participa-

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tion in athletics. For if it is true that women have profited physically by the changes which have taken place in their social status, then they ought to have increased and better body proportions. They ought, then, to show an increase in height, their vital index should be larger, so also with Goldstein's index, lung capacity, chest girth, and muscular strength. With increasing physical vigor, they ought to enter increasingly into spontaneous and vigorous play, for only the old, decrepit, greatly exhausted, and physically wasted, do not play. Spencer held that the play of the young is to release surplus energy and as much can be said of the spontaneous play of adults. Such play doubtless is a very accurate measure of abundant exuberance of physical vigor.

These four subjects, then, fertility, longevity, anthropological measurements, and woman's athletics together with a conclusion, will be the topics for the following chapters.

## CHAPTER II

### Fertility

Since the processes of reproduction very greatly affect every part of a woman's being, it has been justly taken as a test of her physical vigor. J. Lewis Bonhote (12), in a recent study of vigor and heredity, finds that infertility is correlated with a lack of vigor and that health and vitality tend to bring about normal reproduction. He says that in captivity, most animals are "notoriously infertile," and that they show by their coats and in other ways, that they are out of condition. Lion, quail, and other wild forms which are fertile under domestication, he says, show great bodily vigor. Karl Pearson (13) also holds that there may be a possible correlation between strong physiques and fertility. Dr. G. E. Lydson (14) in his book on social disease, quotes with approval Moreau's statement that both sterility and inability to bring the young to a complete development are evidence of racial decline. Certainly, when the animal body is vigorous and healthy, all normal functions tend to be properly discharged. Hence if the mother is possessed of great vigor, the offspring will, in the absence of artificial limitation, be numerous and healthy and such deliv-

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eries and still-births and excessive plural births, as will be shown later, will occur only infrequently. Hence, a study of the comparative fertility of the women of the present with those of several generations ago, will tend to show their comparative bodily vigor.

As already indicated, the size of the family in America has shown a steady decline during the past several decades. This decline is variously spoken of as an increase in sterility, a lack of fecundity, or a decline in fertility. Hence these terms are used interchangeably although they do not denote exactly the same condition. When a marriage is without children, it is said to be a sterile marriage or that the union is infertile. But a lack of fecundity refers more particularly to the organic inability to have children. Doubtless, there are many factors operating to bring about a reduced birth-rate in America, but whatever they may be, they may be classed as functional sterility, potential fecundity and controlled fertility. That is to say, there is either a progressive change in the organic functions of reproduction on the part of women, or else marriage is taking place under such conditions as to make it impossible of fertility, such as later unions, venereal disease, etc., or else the fertility is controlled for social or personal reasons. If it is found that the latter two operate to reduce the birth-rate, then this decline would not indicate at all any decline in organic fertility and hence no decrease in

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the physical vigor. But if the former appears to be the determining factor in birth decline, then it would show a tendency toward physical decay. These topics, functional sterility, potential fecundity, and controlled fertility will be taken up in order.

### PROGRESSIVE FUNCTIONAL STERILITY

An increase in the deaths from nervous and pelvic disorders in the women of the present day as compared with those of former years, would indicate a tendency towards a disturbance of the factors of reproduction and hence would be indicative of physical decline. The following table compiled from the Reports of the Federal Census for the various years, indicates the percentage of female deaths from such diseases to the total number of female deaths:

Years	1870	1880	1890	1900	1910
Causes of Death					
Nervous Disease	.110	.100	.100	.110	.090
Puerperal State	.020	.020	.027	.019	.023
Disease of the Female Organ of Generation	.057	.067	.070	.065	.067

Making all due allowance for the different methods of recording deaths in the different decades and for the fact that in recent years records are more accurately kept, it will be noted that the differences for the separate figures are so slight as to show no trend one way or the other. The fact that, with the advance in modern surgery and medicine, deaths have been delayed for the above diseases, does not affect the validity of the

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above statistics for the deaths with which these have been compared were similarly delayed.

A more recent form of classification of diseases in later Federal Censuses brings to light data on the following diseases, viz., cancer of the breast and ovaries, diseases of the genito-urinary organs, and the ills due to the puerpal state. The table below exhibits the percentages of female deaths from these diseases to the total number of female deaths by two year periods beginning with the year 1905:

Years	1905-6	1907-8	1909-10	1910-11	1913
Cancer of Breast and Ovaries	.022	.022	.021	.021	.030
Diseases of the Gen- ito-urinary, Organs	.074	.075	.076	.078	.083
Accidents of the Puer- pal State	.020	.021	.020	.023	.025

It will be noted here that, for the percentage of deaths due to cancer of the breast and ovaries there has been an increase of less than 1 percent within the last eight years, while the deaths from cancer for the whole population rose from 63 per 100,000 of the population in 1900 to 78.9 by the year 1913. Deaths due to diseases of the genito-urinary organs also increased less than 1 percent while the deaths due to Bright's disease, which is included in the above classification, rose from 89 per 100,000 of the population in 1900 to 102.9 by the year 1913 (15). The cause of the increase in these two diseases for the whole population has yet to be determined and in comparison, woman has certainly held her own.

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Another condition that may be taken as a test of physical decadence is that which tends to make still-births more common. Alfred Russel Wallace (16) lays considerable stress upon this point in his discussion of the increasing number of still-births in certain English towns. He points out that the increase in the percentage of still-and non-viable births clearly indicates that the women of these towns are undergoing a physical decline. Of course, in those cases he relates it to unwholesome factory conditions. Talbot (17) in his list of degenerate stigmata does not mention still-births as a mark of degeneracy in women, but further does say that the offspring of women who have neurasthenic disorders do "not retain enough vigor to pass through the normal processes of development." It seems wholly reasonable to suppose that when the mother possesses great physical vigor and is in normal good health, she will properly nourish the foetus and bring it to a healthy birth.

The following table compiled from the annual Reports of the state Boards of Health, exhibits the percentage of still-births to the total number of births in Massachusetts, Vermont, and Connecticut, for the years indicated:

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<b>Massachusetts</b>	1865-70.....	2.9
	1870-75.....	3.6
	1875-80.....	2.9
	1880-85.....	3.2
	1885-90.....	3.4
	1890-95.....	3.5
	1895-00.....	3.7
	1900-05.....	3.7
	1905-10.....	3.5
	1910-13.....	3.5
<b>Vermont</b>	1857-67.....	1.6
	1867-77.....	2.5
	1877-87.....	3.0
	1887-97.....	3.1
	1902-13.....	4.5
<b>Connecticut</b>	1893-98.....	4.2
	1898-03.....	4.3
	1903-08.....	4.3
	1908-13.....	4.0
	1913-14.....	3.7

It will be observed from these tables that in Massachusetts there has been a gain in the number of still-births of less than 1 percent during the period of nearly fifty years. In Vermont the gain has been less than 3 percent for a period of over fifty years while in Connecticut there has been a slight loss during a period of over twenty years. These changes seem too slight to be indicative of a tendency in any direction but it might be well to bear in mind that there has been at the same time much immigration to the New England States and some emigration from them to western states. This latter movement would doubtless take the more vigorous and leave the less sturdy at home. Moreover, local conditions may operate to cause an increase in the percent-

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age of still-births for in New England there are more females over ten years of age engaged in gainful occupations than in any other section of the United States. In New England there is 26.6 percent of such females so engaged, in the Mountain Division, 12.6 percent, while in the Pacific Division there is only 14.6 percent.

Dr. Talbot further lists the tendency to plural births as one of the stigmata of degeneracy. He finds that frequent and multiple births occur most frequently in families of hereditary lunatics. This has been corroborated by Keirman and Harriet Alexander (17) in connection with the Cook County Hospital, Chicago. They found that twins, triplets and quadruplets, were six times as frequent among abnormal parents as among normal ones. Mannin has found similar conditions prevailing in Australia. Valenta (17) in Vienna has noted like results there. He reports the case of an epileptic mother who gave birth to 36 children, including twins six times, quadruplets four times, and twice triplets. Dr. Talbot concludes that results of the same order occur among other classes of the physically degenerate.

According to Spencer's principle of individuation already stated, excessive fertility would indicate a tendency to generalize function rather than to specialize it. That is to say, that among lower types of animals, much of the energy of the female is expended upon reproduction and in not a few cases, the mother forfeits her own life in

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order to bring many offspring into being. Excessive ovulation, therefore, would seem to be an indication of a return to a lower and earlier type. Moreover, according to a study made some years ago by Hall and Smith (18), it seems that families of excessive fertility were inclined to die out. After studying some of the larger families of early New England, they conclude that, where the mother expended her vigor upon a few children, the family continued through many generations and where there were large families, death was excessive and family extinction more common. Hence if excessive ovulation resulting in plural births is an indication of physical decline, it would seem that it ought to show itself in the percentage of plural births of the last half century.

The percentage of plural births to the total number of births in Massachusetts, Vermont and Connecticut (19) for the years indicated is given in the table below:

Massachusetts		Vermont		Connecticut	
Years	%	Years	%	Years	%
1870-75	1.3	1857-62	1.9	1893-98	2.0
1875-80	1.3	1862-67	1.6	1898-03	2.3
1880-85	1.4	1867-72	1.9	1903-08	2.2
1885-90	1.7	1872-77	2.0	1908-13	1.9
1890-95	1.8	1877-82	1.5	1913-14	2.1
1895-00	2.0	1882-87	1.7		
1900-05	2.1	1887-92	1.7		
1905-10	2.1	1892-97	1.3		
1910-13	2.2	1897-02			
		1902-07	2.0		
		1907-13	2.3		

It will be noted that for Massachusetts there has been an increase of less than 1 percent in

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plural births during a period of almost forty years. In Vermont the percent of increase has been less than 1, for a period of over fifty years and that for Connecticut the change has been negligible during a period of about twenty years. Considering the data as a whole, it indicates that there has been probably no change one way or the other for the years covered. Hence, it must again be borne in mind that these figures do not include whatever changes there may have been due to immigration and emigration.

The inability to nurse children at the breast is often taken as a very direct sign of lack of physical vigor and as positively indicative of approaching sterility. Dr. G. Stanley Hall (20) writing in a recent number of the *Cosmopolitan Magazine* says, that "the progressive civilization of the last hundred years has worked terribly against the health and the perpetuity of the whole race. This is seen in the reduced vitality of the multitude that inhabit closely built cities in the diminished size of the family, in the incapacity of many women to bear and nurse children."

Dr. Talbot also thinks that the degeneracy of the female breast, as well as the over-development of the male breast, is a mark of physical degeneracy. It is a well known fact that many mothers of the present day do not nurse their children. However, just at present, there seems to have set in a tendency which makes breast nursing more fashionable. Because mothers of a few years

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ago did not nurse their children, some have rather hastily concluded that they have lost the ability to do so; that if the function is once allowed to remain unused it would atrophy and could then never be regained. This latter statement seems doubtful but in any case it is not at all clearly proven that the ability has been lost but on the contrary there is evidence that the ability has simply been unrecognized.

Von Bunge (22) who has made an extended study of this subject in Germany thinks that not more than 30 to 50 percent of the mothers of Berlin are able to nourish their children properly. This decline, however, he attributes to alcoholism, tuberculosis, etc., and not directly to organic inability. According to Woodruff (23) the cause of the inability to nurse their children in the cases of 12,000 mothers in New York who came under his observation in 1908, was lack of proper and sufficient food. Dr. Abram Jacobi (24) says: "Our women, poor and rich, suffer from no organic mammary degeneration." Dr. Sedgwick (25) finds that 93 percent of the mothers were able to nurse their children at least one month under proper instructions and that 88 percent were able to do so for three months, and that 77 percent for six months. These are the results of 1,501 clinic cases. Basing his calculations on two questionnaires sent out to the wives of American physicians, he further concludes that 80 percent of them were able to nurse their children three

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months or longer. In a study made by a Fall River physician (26), it was found that there were no cases where there was a deficiency of milk, "although almost every mother thought she could not nurse her child." Dr. L. Emmett Holt (28) writing in the American Journal of the Diseases of Children, estimates that not over 25 percent of the well-to-do mothers in New York are able to nurse their children. Mme. Dluskin (29) thinks that in Paris only 1 percent of the well-to-do mothers nurse their children at the breast. Von Bunge (22) in an attempt to determine whether the ability to nurse children at the breast was in any way hereditary, made a very careful study of several groups of mothers and their married daughters in Germany. His first group consisted of 519 cases. The results were as follows:

Mothers of these daughters, able 422 cases or 99.8 %  
Mothers of these daughters, unable 1 case or .2 %

In 1110 cases where daughters were unable to nurse their children:

Mothers of these daughters unable, 436 cases or 60.8 %  
Mothers of these daughters, able 281 cases or 39.2 %

In 703 cases where the mothers were able to nurse their children:

Daughters of these mothers able 60 per cent.  
Daughters of these mothers unable 40 per cent.

In 436 cases where the mothers were unable to nurse their children:

Daughters of these mothers unable 99.8 per cent.  
Daughters of these mothers able .2 per cent.

The evidence here plainly is that the ability to nurse children is of an hereditary nature but Von Bunge concludes further that the ability to do so is often unrecognized and needs training. He also

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suggests that even in cases where the women of earlier generations did nurse their children, they may have been under-nourished and that this may have contributed to the excessive infant mortality of former years. That is, babies may then have died from partial starvation and that now since breast feeding has been supplemented by artificial infant food, babies are better nourished and therefore die of under-nourishment less frequently.

The increase in the sale and manufacture of infant foods has an interesting bearing on this question. According to the Report of the Manufacturers for 1912, the sale of condensed milk had risen from 187 million pounds in 1900 to 495 million pounds in 1910. In personal letters to the author several of the manufacturers and importers (30) of infant foods state that their business has greatly increased within the last seven years, in one case the increase being as much as 500 per cent.

From all the evidence here presented, it appears that breast nursing has greatly declined within recent years but there is no conclusive evidence that the ability to do so has decreased. Moreover, it seems probable that changes in fashion making nursing more respectable and the wider realization of the value of exercising this function, will greatly increase its prevalence.

### POTENTIAL FECUNDITY

If there is no marked tendency towards pro-

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gressive organic infertility, as shown above, then the decline in the apparent fertility as shown by the falling birth-rate, must be due to other factors. As already indicated, it may be due to a decline in the potential fecundity, i. e., to marriages taking place under conditions in which it would be impossible to exhibit as high a degree of fertility as formerly. Among these conditions, school life, which delays the time of marriage, and venereal disease, doubtless are very important.

It is a well established fact, that fecundity is inversely proportionate to the age of the woman, declining somewhat after the age of twenty-five, being greatest about nineteen or twenty. Dr. Hankins (31) finds that the age of marriage for the whole population at large has been increasing since about the year 1900 but he shows that statistical evidence seems to minimize its significance and that no large part of the decrease in the number of births can be attributed to this.

Hall and Smith (18) working on the graduates of Harvard and other eastern colleges, found that the birth-rate among them was less than for the population at large. Reckoned per father, the number of children of Harvard graduates fell during the decade 1880-90 from 3.44 to 2.22 and during the next decade from 2.22 to 1.92. But with the increasing age at marriage for those who spend four years in college this would not necessarily indicate any increase in organic infertility. Indeed, if viewed in the light of studies made on

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other college women, it indicates nothing more than infertility due to an increased age and a desire for higher standards of personal comfort.

There is a common belief that intellectual pursuits and school life are particularly unfavorable to both the physical vigor of women and to their fertility. The following studies tend to show the fallacy of such belief. One of the latest studies along this line is that of Mrs. Hollingsworth (32) who quotes evidence to show that school life is not particularly injurious to women. John Dewey, she points out, made a study of 290 girls as long ago as 1886 among whom he found only 3 percent who had any real disturbances in their functional periodicity and many were even improved, all but 4 percent being in better health during their residence in college than they were after graduation. Mr. G. A. Preston (33), studying the same question, found that at Amherst College, out of over 200 girls only 2.75 percent dropped out of school as the result of ill health as compared with 2.85 percent for the boys.

Observations (34) made on 2,000 girls in finishing schools and colleges in America, showed that 60 percent had some rather serious functional disturbance but that it dated, not from entry into school, but from puberty. However those who remained in school for four years and submitted to four yearly examinations, 30 percent showed a marked improvement, 30 percent were uninfluenced, while 40 percent were undecided. In the

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case of 100 Oberlin College girls (35), in 1899, 48 reported that their health since entering school was the same as before, 43 reported a decided improvement, and 9 were not so well as before. Eighty had gained in muscular strength, 12 had lost, 98 had gained in lung capacity while 2 had lost.

Mrs. Henry Sedgwick (36) as far back as 1890 made a study of the health of the women students at Oxford and concluded that they married later than their sisters who did not attend college but found that their health was as good. Her studies included 84 families. She found the average age of students at marriage to be 26.7 years and that of their sisters 25.6. She concludes that "we may say with confidence that there is nothing in a university education at all especially injurious to the constitution of woman or involving any greater strain than she can ordinarily bear without injury. As mothers of healthy families, we have seen that students are more satisfactory than their sisters."

If intellectual pursuits tend to induce organic sterility, the great increase in the attendance of women in high schools, colleges, and technical schools would present a grave problem from this standpoint alone but from the above it seems that normal functional activity is not disturbed by school life.

Another factor contributing to reduced fecundity is venereal disease. If it is as wide-spread as

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is estimated by some writers, it would certainly have a very marked effect upon the birth-rate and might, moreover, contribute in time to a reduced physical vigor.

Erb (37) estimates that from 10 to 12 percent of the whole adult population of Berlin is syphiletic. Le Noir (38) estimates that 13 percent of the population of Paris is similarly infected. Lournier (39) of the British Venereal Commission, in a Wasserman survey of 500 healthy English workmen, found that 9.2 percent gave a positive reaction. Barrett (40) in Melbourne in like manner found 14.4 percent syphiletic. It is also estimated that from 7 to 12 percent of the U. S. army is syphiletic but Nichols (41) thinks this is too high and places it at 5 percent and thinks that the percent is no higher here than for the male population of the United States generally.

If it is true that five times as many males have it as females (42), then something over 3 percent of the entire population is infected with syphilis. Furthermore, it is contracted mostly during ages of otherwise greatest fecundity, the average maximum age for men being from 22 to 25 years and for women from about 18 to 22.

Other estimates of the percentage of infected population vary. One estimate (43) puts the percentage for the United States at from 5 to 18 percent. This estimate is furthermore made that 60 percent of the men of the United States have either gonorrhoea or syphilis. Another writer

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(44) estimates that at least 1 out of every 3 males in the United States suffers from some form of venereal disease.

The effect which such a wide-spread infection would have on fertility would be very marked. Jacques Bertillon (45) estimates that from 10 to 13 percent of the French marriages are sterile. Neisser regards gonorrhoea as responsible for 45 percent of all sterile marriages. Dr. Prince Morrow (46) thinks that some form of venereal disease is responsible for as much as 50 or 75 percent in sterility in marriage and that at least one out of every seven marriages in the United States is sterile. Another estimate (47) is that 45 percent of sterility in marriage and that at least one

Even if one accepts with confidence the lower of these estimates, it is certain that venereal infection is a very widespread source of decreased fecundity and this may be taken as a prominent cause in the decline of the birth-rate. To be sure, this infection, does at the same time affect the physical vigor of our population unfavorably but at present one can not but believe that its effect upon fecundity is greater than upon the physical vigor, especially in the case of women who are less infected than men.

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This is another important factor in birth decline. It is exceedingly difficult to estimate just what part this plays in the rather world-wide decline. For various reasons, married people will

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not furnish information which would make possible reliable conclusions here. However, some studies have been made by questionnaire methods and otherwise which have furnished some interesting data.

Professor Cattell (48) investigated the decline in the size of the family among the graduates of three leading eastern universities by means of a questionnaire. He found that their families at the beginning of this century consisted of 5.6 children and of 2.5 or of 2 in 1875 and that at that rate of decrease, the families would be childless by the year 1934. He further found that out of 461 leading scientific men, 167 did not willingly limit their offspring, 285 did voluntarily limit it, and those who were childless were so from choice in about two-thirds of the cases. He further adds that social control of births is necessary if we are to maintain our physical vigor, for in the struggle for existence, it is better to bring two strong children into the world than twelve weak ones. Moreover, he says, "It is evident that a limit of offspring is essential to the conditions of the evolution of a higher race." Geddes and Thompson (49) in England say that "the practice of some form of Neo-Malthusianism is very prevalent among persons of intelligence," and writers are universally agreed that this is an important factor in the decline of the birth-rate generally.

Reviewing the evidence brought forward in this chapter, it seems evident that the decline in the

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birth-rate for the women of America at least, is not due to any progressive organic infertility but rather to what may be called controlled fertility. The modern woman of America seems to be unwilling to be longer under the control of the tyrannies of certain biological laws, but rather desires to take advantage of them for her own good. She seems to be reaching a plane, where instead of yielding both her strength and her own individuality to her offspring alone, she desires to use them for the advancement of her own physical well-being. No longer is she willing to pay her whole debt to the race by bringing forth children in pain, but is seeking to offer in part payment an increase in her own being. If so, then the decline in her apparent fertility is to be correlated with an increase in her physical vigor and not with a lack of it. If this interpretation is correct, then it should show itself in increasing body proportions and an increasing life span. These will be the subjects for the next chapter.

## CHAPTER III

### Longevity and Anthropological Measurements

One of the best indications of physical vigor is survival power which tends to prolong life. Strong, vigorous people usually live longer than those who are weak for their resistance to disease is greater. Indeed, if there were some accurate method of determining whether, under normal circumstances, the span of life was lengthening, it would furnish very conclusive evidence that the physical vigor was on the rise. The following table calculated from the Reports of the Federal Census (50) for the various years, exhibits the percentage of white females to the total number of white females for the different age periods:

Years	Age Period	%
1860	10-15	11.6
1910		11.9
1860	40-50	8.0
1910		9.1
1860	50-60	5.3
1910		6.3
1860	60-70	2.1
1910		3.6

It will be noted that the percentages of white women in all the age periods are relatively larger for the year 1910 than for the year 1860. Moreover, the ratios are larger for the later periods of life, showing an increase in longevity. Of course, infant mortality has been greatly reduced in recent years by improved methods in hygiene but it will be noted that the greatest gain was not in the

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early years, but in the later ones, being greatest for the age period 60-70 years.

Calculations based on the Reports of the Census, show that the percentage of women of child-bearing age, 15 to 50 years, has also increased. This also notes an increased longevity.

Years	Percent
1860	20
1870	24
1910	26

Longevity tables based on records kept for America are not available in years early enough to be of value in this study but the following table for England and Wales kindly furnished by one of the large life insurance companies of America (51), exhibits the conditions there.

Age	1851-1860	1881-90	1891-1900
0	42.15	46.67	47.72
5	50.86	54.27	55.69
15	44.12	46.40	47.51
25	37.37	38.51	39.27
35	30.77	31.08	31.42
45	24.12	24.01	24.08
55	17.30	17.12	17.13
65	11.19	11.17	11.18
75	6.45	6.62	6.66
85	3.48	3.69	3.81
95	1.81	1.97	2.11

This table exhibits what is commonly known as the "expectation of life." Now the expectation of life at any age is the mean after-lifetime of persons who reach that age. Thus, persons who, in the period 1851-60, reached the age of 25

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could expect to live, on the average, at least 37.37 years more. In the period 1881-90 persons reaching that age could expect to live 38.51 years more and in the period 1891 to 1900, 38.27 years more. Tables similar to the above for the males of England and Wales show an increase also in the expectation of life, but on the whole much less than for females.

Table showing the mean annual death rate for females in England and Wales for the different age periods from the year 1850 to the year 1900.

Age	1851-1860	1881-1890	1891-1900
0	62.7	51.9	52.8
5	8.4	5.3	4.4
10	5.1	3.1	2.6
15	7.4	4.4	3.7
20	8.5	5.5	4.5
25	9.9	7.4	6.1
35	12.2	10.6	9.6
45	15.2	15.1	14.7
55	27.0	28.5	28.4
65	58.7	60.4	60.7
75	134.5	130.6	130.6
85	288.9	270.8	261.4

A study of this table will show that the death-rate for almost all the different age periods has shown a steady and persistent fall during the past fifty years. Professor Irving Fisher (52) quotes figures to show that results of the same order obtain for practically all the states of western Europe and adds that "it is noticeable that in practically all cases improvement is more among females than males. This is one expression of progress which womankind is now making in all lands." Thus a study from the two foregoing

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tables will show that, estimated from their expectation of life and of their longevity, the physical vigor of women generally is on the rise. It may be also noted that in the Orient (52), with its perfectly enormous birth-rate, the expectation of life is slight and the death-rate has probably been stationary for centuries.

Another indication that woman's physical well-being is advancing, is the tendency to wear certain articles of clothing larger, more comfortable, and therefore more hygienic than formerly. In attempting to measure this tendency, the author sent out some personal letters to some of the principal manufacturers of women's shoes, gloves, and corsets, asking whether they have noticed such a tendency within the past twenty or twenty-five years. Their answers were as follows:

### WOMEN'S SHOES

Two questions were asked in regard to the size of the shoes:

1 What is the most common size of women's shoe now?

2 What was the most common size twenty years ago?

The first manufacturer (53) replied that there was a tendency in their trade for shoes to be longer but no wider. This, it was said, gave the foot more room and brought it further back from the box and thus had virtually the effect of making it wider.

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The second manufacturer (54) gave practically the same answer and also furnished the following table showing the comparative number of shoes made in the width "C".

Size	No. Pairs
3	25
4	37
4½	67
5	67
5½	73
6	57
6½	42
7	27
7½	18
8	9
8½	4
9	3

The third manufacturer (55) thought that the prevailing size now is "5" and that it was the same 20 years ago but that now the shoes are being made longer in the last. His comparative numbers follow:

Size	No. of Pairs
2½	1½
3	2¼
3½	2 3-4
4	4 3-4
4½	5¼
5	6 3-4
5½	5½
6	3 3-4
6½	1 3-4
7	1¼
7½	0¼
8	0¼

The fourth manufacturer (56) said that in his judgment, the most common size now is "5½" and that 20 years ago it was "5". Taking these

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four answers as a whole, there seems to be a tendency on the part of women to wear larger shoes.

### WOMEN'S GLOVES

In answer to similar questions in regards to women's gloves, the first manufacturer (57) replied that the size varies with the years but "the impression that women now are wearing more comfortably fitting gloves than formerly, is certainly borne out by the facts and we today are cutting all our gloves on broader lines than we did twenty years ago." The second manufacturer (58) in replying bore out the above statement and added that this was especially true in the cheaper grade of gloves, "7" now being the most common size.

### WOMEN'S CORSETS

But two manufacturers of corsets replied but they were among the largest concerns of this kind in the country. The first (59) gave the most common size corset in 1915 as 25 to 27 inch waist measure and that for 1914 as 21 to 23 inches. The second manufacturer (60) said that "up to ten years ago the prevailing sizes were, 18, 19, and 20 inches with but few above 26 inches in the waist." Today, it was further said, there are practically no corsets sold in size 18 and very few in 19 or 20 and that a woman who would then have bought a number 18 would now buy a 22, the sizes most in demand being 22 to 28. This data is meagre and doubtless would vary somewhat with the

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years, but both of the above manufacturers are certain that the old "hour-glass figure" is gone never to return.

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The evidence, however, to which most significance will be attached in this study, is the measurements made of the Freshmen girls of five colleges. viz., 200 entering Wellesley (61) in 1881, 200 entering in 1901 and 200 entering in 1915; 50 entering Mt. Holyoke (63) in 1885, 50 entering in 1890, 50 entering in 1895, 50 entering in 1900, 50 entering in 1905, 50 entering in 1910, and 50 entering in 1915; 50 entering Smith College (62) in 1889, 50 entering in 1897, 50 entering in 1900, 50 entering in 1905, 50 entering in 1910, and 50 entering in 1915; 200 entering the University of Nebraska (64) in 1892, 200 entering in 1903, and 200 entering in 1915; and 1600 entering Oberlin College (65) during the period 1886-1903, and 1600 entering during the period 1909-15.

Tables exhibiting the averages of these measurements for all five colleges follow:

## ANTHROPOLOGICAL MEASUREMENTS

### Arithmetical Averages for the Various Physical Measurements of 200 Girls Entering Wellesley College in the Years 1881-4, 200 Entering in the Year 1901, 200 Entering in the Year 1915

Year	1881-4	1901	1915
Age	19.2	18	18
Weight	118.5	119	117.4
Height	158	161.1	161.3
Lung Capacity	159.2	159.8	161.4
Strength Right Forearm	24.4	24.1	25.2
Strength Left Forearm	20.8	22	22.2
Strength Back	61.7		67.2
Strength Legs	84.8	62.2	84
Chest Depth	21.7	24.8	26.4
Vital Index	13.4	13.4	13.8
Goldstein's Index	13.7	15.5	16

### Arithmetical Averages of the Various Physical Measurements of 50 Girls Entering Mr. Holyoke College in the Year 1885, 50 Entering in 1890, 50 Entering in 1895, 50 Entering in 1900, 50 Entering in 1905, 50 Entering in 1910, and 50 Entering in 1915.

Year	1885	1890	1895	1900	1905	1910	1915
Age	20.8	19.9	18.9	18.5	19.1	19.1	18.7
Weight	112.8		110.3	110.8	117.6	119.4	117.9
Height	159.2	160.2	159.3	165.1	160.8	160.7	159.1
Lung Cap'y	164	160.2	159.9	159.9		164.9	162.5
Strength R. Frm. 20	20	21.7	19.2	29.2	27.2	29.7	28.8
Strength Back	61.3	70	49.3	48.1	65.2	63	71.3
Chest Girth	81.1	80.6	79.7	79.9	82.9	84.2	81.5
Vital Index	14.6		13.6	13.6	14.9	13.9	13.7
Goldstein's Ind.	50.9	50.3	51.2	51.2	51.5	51.4	51.3

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**Arithmetical Averages of the Various Physical Measurements of 50 Girls Entering Smith College in the year 1889, 50 Entering in 1897, 50 Entering in 1900, 50 Entering in 1905, 50 Entering in 1910, and 50 Entering in 1915**

Year	1889	1897	1900	1905	1910	1915
Age	21.5	18.7	18.4	17.3		18.6
Weight	114	115.7	116.1	120.3	123.7	122
Height	159.1	162.1	162.4	160.2	163	161.5
Waist	62.5	61.5	60.8	58.5	63.5	61.5
Lung Capacity	140	156	164.2	174.1	167	162.9
Strength R. F'm.	19.8	23.6	23	23.2	25.5	24.9
Strength Back	71.9	60.7	68.1	96	78.2	77.3
Chest Girth (full)	80.5	79.8	80.9	84.4	84.8	83.7
Vital Index	12.6	13.1	14.1	14.5	13.6	13.3
Goldstein's Index	50.6	49.2	49.8	52.7	52	51.8

**Arithmetical Averages of the Various Physical Measurements of 200 Girls Entering the University of Nebraska in the Year 1892, 200 Entering in 1903, and 200 Entering in 1915**

Year	1892	1903	1915
Age	19.6	19.6	19.4
Weight	110.1	115.7	123.6
Height	157.8	160.5	160.1
Lung Capacity	151	148	164
Chest Girth (not full)	74.7	79.6	79
Vital Index	13.7	12.8	13.2
Goldstein's Index	47.5	49.5	49.4

## ANTHROPOLOGICAL MEASUREMENTS

**Arithmetical Averages of the Physical Measurements of  
1,600 Girls Entering Oberlin College During the Per-  
iod 1886 to 1903, and 1,600 Entering During the  
Period 1909 to 1915**

	1886-1903	1909-1915
Age	19.3	19.2
Weight	112.4	117.2
Height	159	160.8
Lung Capacity	141.3	157
Strength, Back	119	137.3
Strength Right Arm	47.2	61.7
Strength, Legs	168.6	147.9
Chest Girth (not full)	75.2	79.8
Vital Index	12.5	13.3
Goldstein's Index	47.1	50.1

**Arithmetical Averages of the Foregoing Tables, which includes the Physical Measurements of 300 Freshmen Girls in Wellesly College for a period of 33 years, 350 Freshman Girls in Mt. Holyoks College during a period of 30 years, 300 Freshman Girls in Smith College during a period of 26 years, 600 Freshman Girls in Nebraska University during a period of 23 years and 3,200 Freshman Girls in Oberlin College during a period of 29 years. All the records were divided into an earlier and later half and these two averaged against each other.**

Colleges	Wellesley		Holyoke		Nebraska		Smith		Oberlin	
	1st	2d	1st	2d	1st	2d	1st	2d	1st	2d
Age	18.6	18.0	19.5	18.8	19.6	18.5	19.5	18.4	19.3	19.2
Weight	118.7	118.2	111.3	116.4	112.9	119.6	114.4	122.0	112.4	118.2
Height	159.5	161.2	158.7	159.1	159.1	160.3	161.2	161.6	159.0	160.8
Chest Girth	76.9	84.0	80.3	82.1	77.1	78.3	80.4	84.3	75.9	79.7
Lung Capacity	159.5	160.6	156.5	163.0	149.0	156.0	152.0	167.9	141.3	157.0
Vital Index	13.4	13.6	13.9	14.0	13.2	13.0	13.2	14.8	12.5	13.5
Goldstein Index	48.2	52.1	50.9	51.3	48.5	49.9	49.8	51.3	47.1	50.1

The last table is worth studying with some care for it shows the arithmetical averages of all the different groups. It will be observed that

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1. For all five colleges there has been a slight decline in the age of entrance, the average now being not far from 19 years. After this age, changes in the essential measurements such as vital index, height, lung capacity, and Goldstein's index, are exceedingly slight.

2. The weight, with the single exception of Wellesley, shows also a slight gain. This of itself has no beneficial significance but if it is in excess, might indicate a detrimental trend. It is possible that it is correlated with more and better food, and more exercise in the open air.

3. The height in all cases shows a slight gain and while it is small, yet it would seem as if any increase in height would be significant (66). It has always been taken as a test of military fitness. Ripley (67) says that "the relation between stature and health is brought to a concrete expression in the armies of Europe through a rejection of all recruits for service who fall below a certain height, generally about 5 feet. Other things being equal, a goodly stature in youth implies a surplus of energy over and above the amount requisite merely to sustain life. Hence it follows, more often than otherwise, that a tall population implies a relatively healthy one." Moreover, there is evidence that tallness in children is correlated with success in school. Dr. Burnham (68) gives the following data: among 8,000 children examined of the same age,

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those 105 cm in height none were perfect in health  
those 110 cm in height 17% were perfect in health  
those 115 cm in height 20% were perfect in health  
those 120 cm in height 38% were perfect in health  
over 120 cm in height 45% were perfect in health

This plainly indicates the importance of height as a factor in physical vigor.

4. It will be noted that in all cases the chest girth has increased. In the case of Wellesley, the increase is as much as 7 cm. Moreover, it will be seen that there is no uniformity among the different groups for this measurement. This may be due to the methods of taking the measurements for sometimes the chest is partially expanded and sometimes fully relaxed. Also the styles of dress prevailing at different times may not have been without some influence. The significance of the chest girth will be discussed under Goldstein's index.

5. The measurements of the lung capacity are subject to the same variations as were found in taking the chest measurements. Its importance will be discussed under the vital index.

6. The vital index (69) is a very important physical index for it shows the relation between the amount of oxygen supplied to the tissues and the amount of oxidizable tissue, and is found by dividing the vital capacity of the lungs by the weight of the body. If then, the vital capacity of the lungs be large in proportion to the body weight, the body will have a good supply of oxy-

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gen, metabolism will be vigorous, and the resistance to disease will be high but if the proportions be reversed, then the metabolism will be more sluggish. Now it is to be noticed that four out of the five colleges, there has been a change in this index, and although small, it has been all in one direction, that is, it has constantly and persistently increased. This can have but one interpretation, namely, that there has been an increase in the physical vigor of the later groups over that of the former ones.

7. Goldstein's index is of like importance. It is the chest-girth-height index and is found by multiplying the chest girth by 100 and dividing by the height. The chest circumference has always received considerable attention and has always been regarded as a test for military fitness. The amount it exceeds half the height has been taken as a test of physical vigor. According to DeBusk (70) there is an inverse proportion between the amount the chest circumference exceeds half the height and the rate of infant mortality. Now it will be seen from the last table, that in all cases where it was possible to compute it, Goldstein's index has increased.

Taking the data of the colleges as a whole, they show an upward trend within the past four decades. This is synchronous with the release of woman from excessive household duties and child-bearing. Also, about this time there was a noticeable increase in the number of high schools in the

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country and the Reports of the United States Commissioner of schools show that the girls entered these in larger numbers, in many cases outnumbering the boys. This is another indication that the surplus energy of the younger women of America, as soon as opportunity presented itself, is being expended in increasing the physical vigor. Moreover, while the younger women are thus increasing in height, chest, girth, and vital index, women of all ages, according to the data in the earlier part of this chapter, are showing a reduced mortality and a higher expectation of life. These are certainly most significant indications of woman's increasing physical vigor.

## CHAPTER IV

### **Interest and Particiation in Athletics**

That the nature of a people's sports is a rather sure index of their physical vigor is well known Professor Fetter (71) says that, "The choice of sports and the temperance in their pursuit are among the surest tests of the wisdom in men and societies. A love of vigorous play, no less than the power of sustained work, marks the dominant and progressive peoples of the earth." When physical vigor declines, so does the interest in sports decline. When the Greeks were at their best, so were the Olympic Games at the highest point of their excellence, and during the palmy days of Rome, the arena was the scene of sturdy and vigorous, even if savage, sports while in her declining days these deteriorated into the circus and into unspeakable cruelties.

Vigorous people engage in vigorous play. Spencer, as already pointed out, held that play in the young is to release surplus energy. Karl Groos (73) held that play is getting ready for the activities of after life. Stanley Hall and others think that play represents inherent motor reactions but all three theories assume a close correlation with physical vigor. This is suggested by the rise in

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the strenuousness of the child's play as he advances in years. Gulick (72) notes this and points out that in infancy, play is mild in form but as the child increases in years and vigor, its play tends to become more strenuous until at last it culminates in such games as boxing, foot-ball, wrestling, etc.

If this be true, then the women of America have made notable progress in their physical vigor within recent years for they have entered increasingly into athletics. This shows not only a vigor of body but a change of mental attitude as well for it bespeaks the breaking down of many useless and outgrown taboos in reference to her mode of dress and freer bodily movements. Her engaging in mixed tennis matches, etc., not only gives indication of enlarging physical powers but of the passing of much former prudery, this latter being probably as great a gain as the former.

This increase in woman's interest in athletics is also to be correlated with her release from former modes of activity which used up much of her available energy and with these gone, it is now no unusual sight to see mothers engaging in tennis, golf, etc., with their own sons and daughters. This present interest may also be related to her increased attendance in schools and colleges for there, with an abundance of young life, sports and games are sure to find a place.

In order to obtain data from which an estimate could be made of this increased participation in

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athletics, the author wrote to one of the largest dealers in athletic goods in this country, Mr. A. G. Spalding and Brother (74), in reference to the comparative increase in the sale of women's athletic goods. Their estimate follows:

Percent of tennis rackets bought by women as compared with men twenty years ago, 1896, 10.

Percent of tennis rackets bought by women as compared with men, 1915, 30.

Percent of golf clubs bought by women as compared with men twenty years ago, 1896, 3.

Percent of golf clubs bought by women as compared with men, 1916, 15.

It will be seen from this comparison that the sale of these two forms of athletic goods has increased many fold within the last twenty years, nor does this take into account the great number of men's tennis rackets, golf clubs, etc., constantly used and preferred by women.

Not only so, but there has been a notable increase in the participation of women of the colleges in the various forms of athletic games. In an attempt to estimate this, the author sent out a questionnaire of six questions to 100 women's and co-educational colleges. The questions were:

1. What athletic games were played, 1916, by the women of your college?

2. What athletic games were played 20 years ago by the women of your college?

3. What percent of your students take part in at least some of the games now?

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4. What percent of your students took part in some of the games 20 years ago?

5. Are inter-class or inter-scholastic games allowed?

6. In what year was systematic physical training introduced?

To this questionnaire sixty-one answers were received. The answers to the first two questions are tabulated as follows:

	1896		1916	
	Colleges	%	Colleges	%
Tennis	15	24.5	60	98.3
Basketball	4	6.5	61	100
Hockey			28	45.9
Baseball (indoor and out)			32	52.4
Rowing	1	1.6	11	18
Field and Track	1	1.6	24	39.3
Swimming			18	29.5
Archery			8	13.1
Volleyball			10	16.3
Handball	1	1.6	3	4.9

In addition at least two colleges engaged in cricket, golf, croquet, riding, fencing, or bowling.

It will be observed from this table that the number of colleges in which these games were played twenty years ago was very small as compared with the number playing them today and that in all the colleges, basket ball is now played and tennis in all but one. Baseball, either indoor or outdoor, is played now by over half the colleges while twenty years ago it was played in no college. The recent survey of the Cleveland schools (75) reports that 91 percent of the high school girls play baseball on the school grounds

## PHYSICAL VIGOR OF AMERICAN WOMEN

and many more play it elsewhere and that 35 per cent play basket ball.

The answers to the third and fourth questions, viz., the percent of students taking part in at least one sport twenty years ago and now are tabulated as follows:

% Students Playing	1896		1916	
	No.	Colleges	No.	Colleges
10	8		4	
20	3		3	
30	2		6	
40	1		3	
50	1		8	
60	1		4	
70			11	
80			7	
90			4	
100	1		10	

It will be seen from this table that every college replying (some did not answer questions 3 and 4) has some form of women's athletics now and that the percent of women taking part in them has steadily increased since 1896 and that by 1916, in 10 colleges every woman enrolled took some part in the sports, while twenty years ago only in 1 college all of the women enrolled played in the games.

The answers to question 5 were as follows:

No. of colleges playing inter-class games only,	48
inter-school	14
both	13
themselves	10

From this table it will be seen that there is very little of the spectacular or circus element in col-

## PARTICIPATION IN ATHLETICS

lege women's athletics. Some schools in answering this question replied that their games were limited to certain schools or athletic clubs.

The answers to question 6, viz., the year in which systematic physical training was introduced, are as follows:

Year in which physical train- ing was intro- duced	1890	1895	1900	1905	1910-15
No. of colleges	18	22	29	42	54
Not introduced at all,	7				

From a review of the foregoing data in regards to women's athletics in college, it is evident that within the last twenty years, there has been a very marked increase, not only in the number of colleges interested, but in the number of students who take part in them. This is especially significant when it is recalled that Mr. Durrant (96) in equipping Wellesley College no longer ago than 1880, found no women's tennis equipment in this country but was obliged to send to England for it. Moreover, in not a few cases where colleges replied that athletics was neglected because of lack of equipment, there was expressed a note of regret and in no case was it said that the women had no athletics and did not want any. This too is significant when it is remembered that not so many years ago, to be delicate, dainty and doll-like was an unfailing mark of female culture.

## CHAPTER V

### Conclusion.

What does the foregoing array of facts indicate in regard to the physical vigor of the women of America? Before formulating a final answer, let us review the facts separately.

1. Soon after the period which was spoken of in this study as the one in which the large family began to disappear, the women of America began to enter the schools and colleges in greater numbers than heretofore, the attendance increasing 148.7 percent during the decade 1890 to 1900 over any previous decade. Likewise the percent of gain for the period 1880 to 1890 was greater than for any earlier decade. Women also entered the professions and business, especially the profession of teaching where the number of female teachers increased from 84,000 in 1870 to 467,000 by the year 1910.

2. There was found to be no real evidence of any increasing functional sterility as shown by (a) no notable increase in female pelvic diseases, (b) no significant increase in the percent of stillbirths, (c) likewise none in the number of plural births, (d) no evidence of any organic atrophy of the mammary glands, but that apparent sterility

## CONCLUSION

is due to (e) social and personal reasons, (f) that school life is not detrimental to fertility and that (g) much of the apparent sterility is due to venereal disease.

3. It was furthermore found that the longevity was increasing for women even more rapidly than for men.

4. The anthropological measurements of unselected groups of girls entering Wellesley College, Mt. Holyoke College, Smith College, Nebraska State University, and Oberlin College, covering in all a period of years from 1881 to 1916, were found to show a tendency to change and that that change to be all in one direction, viz., to increase. This was thought to be important, notwithstanding the fact that out of the whole female population of America, anthropometric data could be obtained for only so few women. However, there is a considerable mixing of the different strata in American society so that in these colleges, many, perhaps all, classes of society were represented. Furthermore, by the decade 1900 to 1910, nearly one out of every sixty white girls under the age of 24 had been in some school of higher learning (77). Moreover, every state in the Union was represented in these college groups, although data of comparative values was unobtainable for southern colleges.

5. In women's athletics, there was seen to be a great advance especially among college women. This was shown by the greatly increasing num-

## PHYSICAL VIGOR OF AMERICAN WOMEN

bers of colleges taking up various forms of athletic sports.

Finally, the sober student of humanity can be neither wholly pessimistic nor yet unqualifiedly optimistic in attempting to judge its progress, yet from a study of the preceding pages, it appears that, so far as the female part of the population is concerned, the women of America are giving unmistakable evidence of an advance in their physical vigor. And this we have correlated with forces now at work tending towards woman's greater individuation.

There are doubtless, some classes of women who had small representation in this study. There are those who never go to college, nor enter the professions, nor play games, and who do not get into the classifications of the life insurance tables. It might be that those would not show so great physical advance but if they would not, that would only go to prove the present thesis, that release from former excessive household cares affords energy for growth and development. What this unrepresented portion of our female population doubtless needs most, is to have better and more food, fewer children, less household drudgery, more time for recreation, and more opportunity for schooling. What it would mean for a very large number of our women to have good wholesome food, and leisure to be out in the open air, and enough vigor remaining to really play, is beyond calculation. It wholly staggers the imagin-

## CONCLUSION

ation to picture some of these women, who now eat, work, and sleep in a few dirty rooms in the midst of an all too numerous offspring, out in the open engaging in any sort of spontaneous activity which bespeaks abounding physical life. And if they did the benefit to the nation at large in after years, could hardly be estimated.

When it is suggested that women ought to be given an enlarged place especially as suggested in the foregoing pages, a common reply is, that woman's place is in the home, by which is meant that she ought to keep house and bear children. This contains a truth but not all the truth, for it does seem as if these duties ought not to be so excessive as to prevent her own development.

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